Abstract Title Page
Not included in page count.

Title: Expanding the 5Es From Chicago to Illinois: How the 5E's Relationship to Student Outcomes Varies By Content

Authors and Affiliations:

Molly Gordon, UChicago Consortium on Chicago School Research
Joshua Klugman, UChicago Consortium on Chicago School Research
Penny Bender Sebring, UChicago Consortium on Chicago School Research
Susan Sporte, UChicago Consortium on Chicago School Research

Abstract Body

Background / Context:

Why are some schools able to thrive and produce strong student outcomes, while others struggle? To answer this question, researchers have surveyed teachers and students in Chicago Public Schools (CPS) since the 1990s, asking them about their schools' organizational climate and practices. From these data, researchers at the Consortium on Chicago School Research (CCSR) concluded that five *essential supports* of the schools' organization facilitate engaging instruction and learning: effective leadership, collaborative teachers, involved families, supportive environments, and ambitious instruction. Schools strong in these practice domains were much more likely than schools weak in these areas to see improvements in student outcomes, including attendance and learning gains (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010).

Research on school climate and school organization, including that of CCSR, influenced Illinois legislators in 2011 to mandate the collection of data on teacher and student perceptions of schools' instructional environments to provide feedback to principals. The state turned to CCSR's *5Essentials* survey instrument, and it was fielded statewide for the first time in spring of 2013. Students (grades 6-12) and teachers took surveys measuring the essential supports in their schools, allowing us to examine the extent to which schools across Illinois are strong or weak in these essential supports and better understand how the supports function in different community contexts across Illinois.

Research Questions:

Illinois took measures of essential supports tested and refined in one context (CPS) and required its administration statewide. Using this statewide data, we address two overarching research questions:

(1) How does strength and weakness on the five essential supports vary according to urbanicity, enrollment size of school, and socioeconomic characteristics of school communities?

(2) Are the five essential supports related to student outcomes including attendance rates, test scores, and graduation rates?

Setting:

Surveys measuring the essential supports were administered to students and teachers in nearly all public schools in Illinois in the spring of 2013.

Population / Participants / Subjects:

Students in grades 6-12 and all full-time classroom teachers in public schools in Illinois were eligible to take the survey. Out of 152,462 teachers in Illinois, 104,270 (68 percent) took the survey, and out of 1,101,025 students in grades 6-12 in Illinois, 750,329 (68 percent) completed the survey. All told, usable data was collected from 3,684 Illinois schools (85 percent).

Intervention / Program / Practice:

Survey data were collected via the web. School staff facilitated data collection among students and monitored response rates for both students and teachers. The surveys took on average 20 minutes to complete.

Research Design:

Cross-sectional survey data were linked to official data on school and community demographics and student outcomes, aggregated at the school level.

Data Collection and Analysis:

The Essential Supports

The 5Essential survey items are submitted to Rasch measurement models to create 22 different measures, which in turn are averaged to constitute the five essential supports. We also constructed a measure of the "average essential" based on the mean of the five essential supports. See Figure 1 for a listing of each measure and their corresponding essential support.

(please insert figure 1 here)

Community Contexts Shaping the Essential Supports

For community contexts, we used measures from the U.S. Census Bureau and Common Core of Data (CCD). For **urbanicity**, we distinguished between *CPS schools*; schools outside Chicago in Census-designated *urban* areas (territories with at least 50,000 residents that are principal cities in core-based statistical areas), *suburban* areas (territories with at least 50,000 residents that are not principal cities), *towns* (territories with 2,500-50,000 residents), and *rural* areas (territories with fewer than 2,500 residents). **School enrollment size** is the average of student membership as recorded in the 2010-11 and 2011-2012 CCD. **Socioeconomic disadvantage** is a standardized scale of percent of students eligible for free or reduced-price lunches (averaging rates in the 2010-11 and 2011-12 school years), the poverty rate in the school's Census tract, and the percent of jobless males aged 16 or older in the school's Census tract (Census tract variables come from the 2007-11 American Community Survey).

Student Outcomes

We examined a variety of student outcomes measured for a three year period spanning the 2010-11, 2011-12, and 2012-13 school years. For both the primary and secondary grades, we measured schools' **average attendance rates** and schools' **change in attendance rates**. Both of these measures were calculated over the three year period.

For the elementary and middle grades, we had access to the Illinois Standards Achievement Test (ISAT) math and reading test scores (a test given to all Illinois students in grades 3-8) of all Illinois students for the springs of 2011, 2012, and 2013. We performed multilevel modeling on this data to measure each school's **average ISAT growth rate**, as well as their **average ISAT scores**.

For the high school grades, we took schools' average **graduation rates** and average **ACT scores** (in Illinois, all high school students in their junior year take the ACT test). We tried estimating change in graduation rates and ACT scores but the reliabilities of schools' trajectories were extremely low.

Control Variables

We controlled for a variety of factors: urbanicity (defined above), enrollment size, and socioeconomic disadvantage (defined above), socioeconomic advantage (a standardized scale of the years of schooling of adults and the percent of employed civilians in managerial and professional occupations in the school's Census tract, according to the 2007-2011 ACS), school racial composition, charter status, and grade configuration. When average ISAT growth rate is the outcome, we also controlled for schools' initial value (their estimated average ISAT score in 2010-2011).

When we examine elementary and middle schools, we used school district fixed effects; when we examine high schools, we could not do this because few districts have multiple high schools. Instead, for high school outcomes we controlled for the following district characteristics: per pupil expenditures, number of schools in the district, and district-level enrollment, socioeconomic advantage, socioeconomic disadvantage, and racial composition.

Analyses

To understand the links between community context and the Essential Supports, we did basic descriptive analyses without controlling for any covariates. To understand the association between the Essential Supports and student outcomes, we performed school-level regressions. When we analyzed high school outcomes, we performed the regressions separately for CPS schools and schools in the rest of Illinois. When we analyzed outcomes for elementary and middle schools, we performed the regressions separately for CPS schools with the K-8 and 6-8 grade configurations; non-CPS schools with K-8 and 6-8 grade configurations; and schools with a K-5 grade configuration. We had to separate the K-5 schools because their students were not surveyed and thus they had incomplete information on the Essential Supports.

Findings / Results:

Associations between Community Context and the Essential Supports

We found substantial differences among schools in the degree to which students and teachers report strength in the essential supports. A higher proportion of urban and suburban schools are strong in supportive environment and ambitious instruction compared with schools in towns and rural areas. This advantage is particularly pronounced in CPS schools. Schools serving students with socioeconomic disadvantages are less likely to be strong in the essential supports, compared to schools serving more affluent students. We also found differences among schools based on their size. Smaller schools are more likely to have strong essentials than are larger schools, although the pattern is not as clear at the high school level.

Associations between the Essential Supports and Student Outcomes

Standardized coefficients showing the relationships between the essential supports and student outcomes are presented in Table 1. For the most part, we see positive and significant associations, indicating that schools stronger in the essential supports tend to have better student outcomes. However, by conventional standards these associations tend to be weak, hovering around a standardized coefficient of .10. The main exception is for high school outcomes in CPS schools, where the coefficients tend to be large, ranging from 0.2 to 0.4.

(please insert Table 1 here)

Lipsey et al. (2012) have argued that conventional guidelines for effect sizes are not useful in education research. We thus provide a benchmark in Table 2, the standardized effect of socioeconomic disadvantage on each outcome. Using this benchmark, the associations between the essential supports and ISAT growth rates tend to be fairly substantial in K-8 and 6-8 schools throughout Illinois, being at least half of the association between socioeconomic disadvantage and ISAT growth rates. However, even using this benchmark the essential supports have small associations with average ISAT scores and elementary school attendance rates.

(please insert Table 2 here)

The essential support with the largest associations is Supportive Environment, following by Involved Families and Ambitious Instruction. This supports the essential supports framework, which posits that Supportive Environment and Ambitious Instruction are the closest (in a causal sense) to student outcomes.

The associations tend to be weak for K-5 schools. One possible explanation for the small associations—even for average ISAT growth rates—is that K-5 schools are missing two essential supports, Supportive Environments and Ambitious Instructions (because these essential rely on student reports, which were only collected for students in grades 6-12). In future work the Consortium of Chicago School Research will be investigating the utility of collecting student reports in grades 4-5, allowing us to test this possibility.

The fact that the essential supports are more highly associated with student outcomes in CPS high schools than in the rest of the state is noteworthy. There are three potential reasons for why this is. First, CPS teachers and school officials have had greater exposure to the essential supports framework, and they may be more truthful in their reports of the implementation of the essential supports. Second, the 5Essential surveys were designed for the Chicago context, and may be missing relevant aspects of organizational climate in schools outside of large urban contexts (however, in other analyses not presented here we found that the essential supports had larger associations in CPS than in non-Chicago urban contexts in Illinois). Third, the associations in Chicago may reflect particularly strong selection processes; high-performing students may be drawn to schools that are already strong in the essential supports. Chicago's selective enrollment high schools are of particular concern here; students who enroll in these schools are selected on the basis of their test scores and grades. Indeed, removing these schools from the analysis does result in the associations in CPS declining substantially (see Table 2); but they are still stronger than the associations outside of Chicago and they are a substantial fraction of the association with socioeconomic disadvantage.

Conclusions:

This study had two goals. First, to document disparities in essential supports across schools in the entire state. We show that students in rural schools and socioeconomically disadvantaged schools are less likely to experience strong essential supports. The fact that students attending socioeconomically disadvantaged schools have much less access to the essential supports raises substantial equity concerns. Indeed, these students may be most in need of schools that are especially strong. It is important to note that locational inequalities are strongest in ambitious instruction, the essential that is theorized to have the most direct influence on student outcomes.

The second goal is examine the predictive validity of the 5Essential survey outside of Chicago. Overall, the essential supports have positive albeit small associations with student outcomes. However, some of these associations, particularly test score growth in elementary schools, are sizable when they are compared to the associations between student outcomes and socioeconomic disadvantage. Because of data limitations, we cannot prove if the essential supports, as measured by the 5Essentials survey, actually influence student outcomes in Illinois. Rather, this is a first step towards understanding what the essentials framework has to offer schools outside of Chicago. The essential supports offer useful information about how elementary and middle schools (particularly K-8 and 6-8 schools) are organized in Illinois. The weak associations in high schools outside of CPS indicate there may be better ways to capture the essential supports in those contexts.

It is our hope that by collecting and accumulating data for Illinois schools in the future, researchers will gain a thorough understanding of how to measure school climate in various contexts and provide schools and districts with information about how school climate matters (or does not matter) for student outcomes.

Appendices

Appendix A. References

Bryk, A.S., Sebring, P.B., Allensworth, E., Luppescu, S., & Easton, J.Q. (2010). *Organizing Schools for Improvement: Lessons From Chicago*. Chicago, IL: University of Chicago Press.

Lipsey, M.W., Puzio, K., Yun, C., Hebert, M.A., Steinka-Fry, K., Cole, M.W., Roberts, M., Anthony, K.S., & Busick, M.D. (2012). *Translating the statistical representastion of the effects of education interventions into more readily interpretable forms* (NCSER 2013-3000). Washington, DC: National Center for Special Education Research, U.S. Department of Education.

Appendix B. Tables and Figures

Figure 1 • 5Essentials Survey Measures

Ambitious Instruction	**Involved Families**
- Course Clarity (S)	- Human & Social Resources in the Community (S)
- English Instruction (S)	- Outreach to Parents (T)
- Math Instruction (S)	- Teacher-Parent Trust (T)
- Quality of Student Discussion (T)	
	Supportive Environment
Effecive Leaders	- Peer Support for Academic Work (S)
- Teacher Influence (T)	- Academic Personalism (S)
- Principal Instructional Leadership (T)	- Academic Press (S; elem only)
- Program Coherence (T)	- Safety (S)
- Teacher-Principal Trust (T)	- Student-Teacher Trust (S)
	- School-wide Future Orientation (S; HS only)
Collaborative Teachers	- Expectations for Post-Secondard Education (S; HS on
- Collective Responsibility (T)	
- Quality Professional Development (T)	*(S) - Student measure; (T) - Teacher measure*
- School Commitment (T)	
- Teacher-Teacher Trust (T)	

Table 1: Fully Standardized Regression Coefficients ("betas") Showing Associations between Essential Supports and School Outcomes

		Average Essentials (beta)	Effective Leaders (beta)	Collaborative Teachers (beta)	Involved Families (beta)	Supportive Environment (beta)	Ambitious Instruction (beta)	Effect of Socioeconomic Disadvantage (beta)
ISAT Math Gains	Non-CPS	.10*	0.02	0.05	0.09†	0.13*	0.10*	-0.17*
	CPS	0.12*	0.06†	0.10*	0.03	0.10*	0.14*	
	K–5	0.06†	0.05	0.04	0.09*			
ISAT Reading Gains	Non-CPS	0.15*	0.04	0.06†	0.20*	0.20*	0.20*	-0.14*
	CPS	0.07*	0.05	0.05†	0.02	0.04†	0.09*	
	K–5	0.04	0.03	0.02	0.07†			
ISAT Math Level	Non-CPS	0.12*	0.06*	0.11*	0.14*	0.06*	0.05*	-0.58*
	CPS	0.07*	0.00	0.07*	0.08†	0.06*	0.07*	
	K–5	0.12*	0.09*	0.11*	0.15*			
ISAT Reading Level	Non-CPS	0.11*	0.04*	0.09*	0.11*	0.07*	0.05*	-0.66*
	CPS	0.07*	0.00	0.07*	0.10*	0.05*	0.07*	
	K–5	0.12*	0.10*	0.12*	0.16*			
Attendance Rate Change (Elementary Schools)	Non-CPS	0.07*	0.05†	0.05†	0.08†	0.04	0.04	0.04†
	CPS	0.19*	0.11*	0.13*	0.18*	0.15*	0.18*	
	K–5	0.04	0.03	0.03	0.06*			
Attendance Rate Level (Elementary Schools)	Non-CPS	0.09*	0.03	0.08*	0.11*	0.05†	0.04	-0.43*
	CPS	0.03	-0.05	0.04	0.01	0.02	0.07*	
	K–5	0.07*	0.06*	0.08*	0.09*			
Attendance Rate Change (High Schools)	Non-CPS	0.08*	0.03†	0.05*	0.09*	0.10*	0.08*	-0.03
	CPS	0.22*	0.16*	0.21*	0.30*	0.17*	0.15*	
Attendance Rate Level (High Schools)	Non-CPS	0.07*	0.01	0.06*	0.09*	0.11*	0.07*	-.44*
	CPS	0.42*	0.20*	0.31*	0.43*	0.51*	0.45*	
Average ACT Score Level	Non-CPS	0.10*	0.02	0.07*	0.10*	0.18*	0.10*	-0.80*
	CPS	0.36*	0.16*	0.23*	0.32*	0.47*	0.41*	
Graduation Rate Level	Non-CPS	0.10*	0.03	0.06*	0.13*	0.16*	0.07*	-0.48*
	CPS	0.30*	0.14	0.22*	0.27*	0.36*	0.34*	

* $p < .05$; † $p < .10$

Table 2 • Comparing Associations of Essential Supports With High School Outcomes, With and Without Selective Enrollment High Schools in CPS

Outcome	Standardized Coefficent, non-CPS	Standardized Coefficent, CPS (all high schools)	Standardized Coefficent, CPS, no selective enrollment schools	Standardized Coefficent, SCON, statewide
ACT Scores	.10	.36	.19	-.80
Grad Rates	.10	.30	.22	-.48
Change in Attendance Rates	.08	.22	.26	-.03
Attendance Rates	.07	.42	.35	-.44